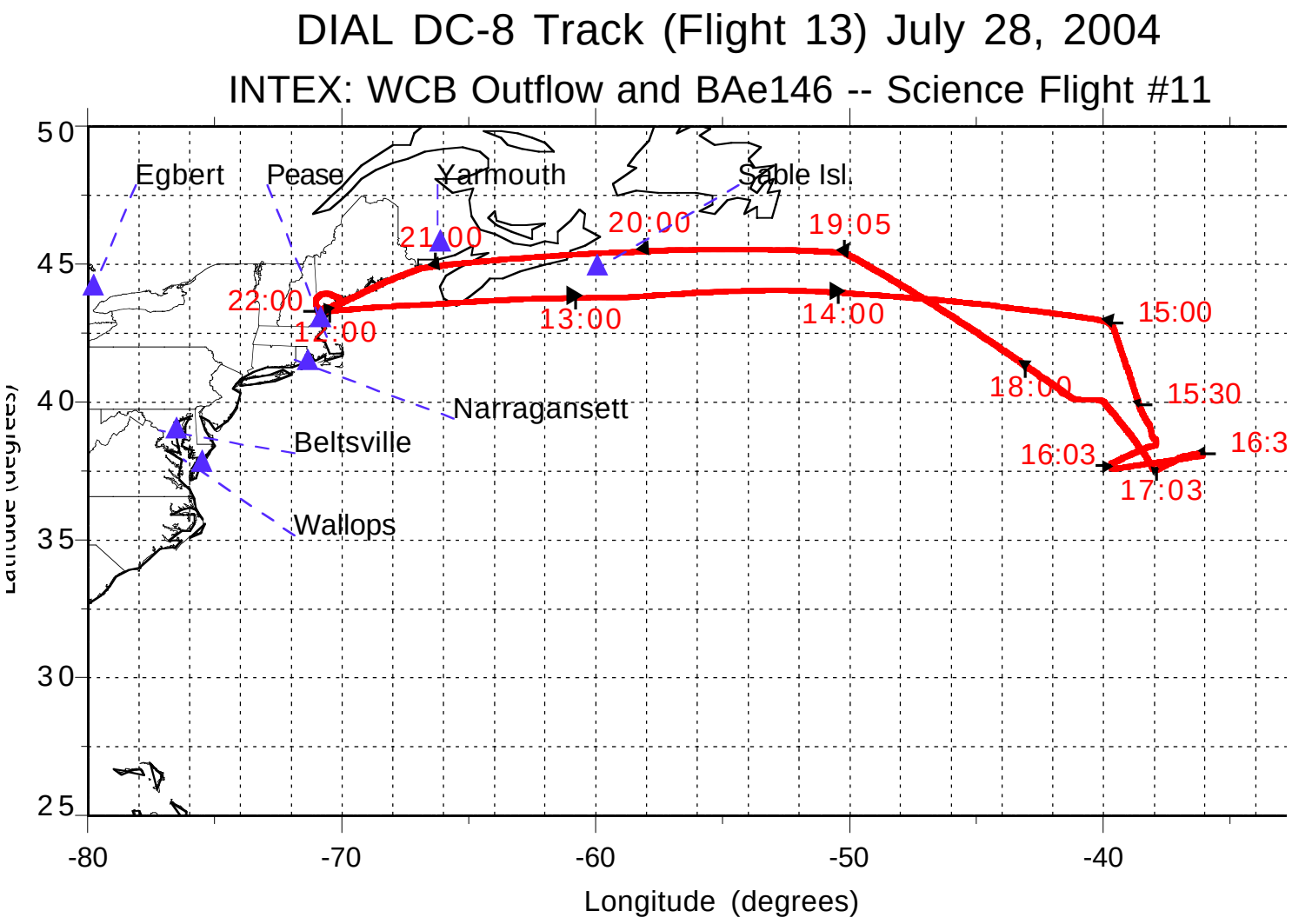
INTEX-NA Flight 13: 28 July 2004

Flight # 13 was the fifth DC-8 science flight from Pease Int'l Tradeport. The two main objectives were to sample the structure and chemical evolution of the US continental outflow out over the Atlantic Ocean and to do a comparison between the measurements on the DC-8 and the BAe146. Takeoff was at 9:53; the total flight duration was 10.2 hours. The comparison was arranged to occur in clear air near 38°N, 38°W. The flight plan and flight are shown in the attached slide. The return flight leg was changed to an east-to-west run at 45°N to sample the core of the predicted outflow

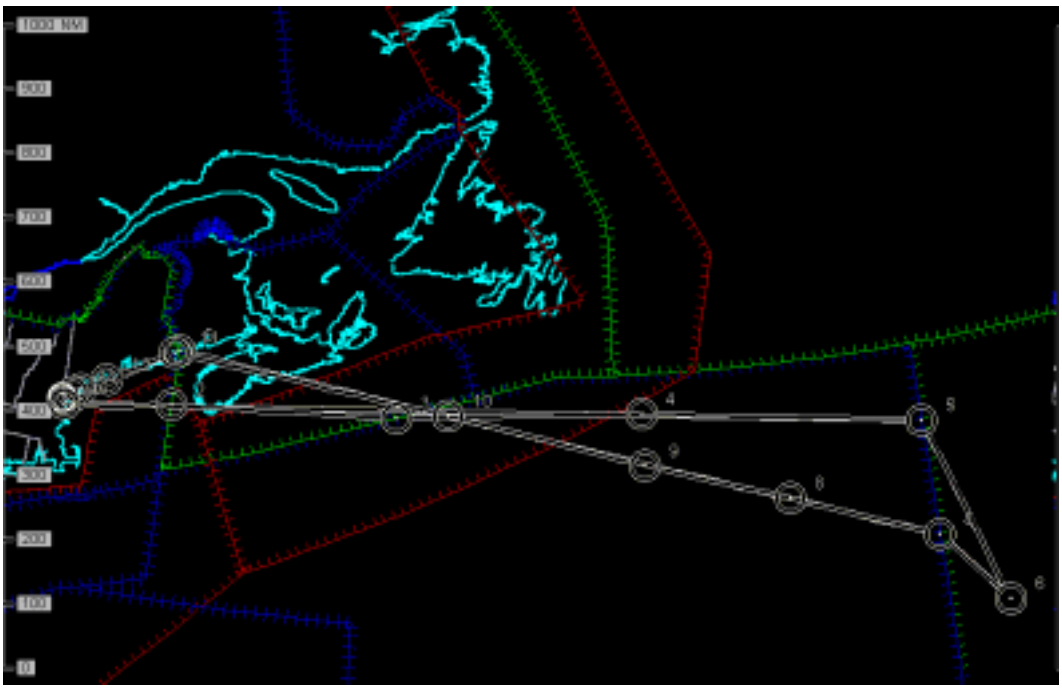
The flight area was dominated by the Bermuda high, with a weak frontal boundary and low pressure area along the Atlantic Coast. Widespread clouds associated with this boundary extended eastward across the North Atlantic along 40 deg. N. These clouds approximately coincided with the continental outflow that was sampled during the flight. Over the flight track, cirrus and low level clouds were abundant, although mid level clouds were more patchy. While the observed cloud band had some characteristics of a "warm conveyor belt", this term is usually applied to narrow and vertically confined ascending flow associated with stronger midlatitude cyclones. The flow in the middle and upper troposphere was influenced by the subtropical high over the ocean and by a short wave trough along the East Coast that was associated with the surface front. Winds near the coast in advance of the short wave were from the southwest, while farther east they mostly were from the west. The jet stream was slightly north of the flight track, with peak speeds during the flight being approximately 85 kt.

Climbing out to the east, we encountered a narrow pollution layer (O_3 ~ 100 ppbv) at about 15 kft and then leveled out at 29 kft in fairly clean air (O_3 ~ 50 – 70 ppbv) between a deepening layer below and a high ozone region above 40 kft. Regions of enhanced pollution were encountered on the run at 43°N between 65°-63°W, 60°-55°W, and 45°W all the way into a deep cloud bank. We broke out of the clouds just short of the rendezvous point with the BAe146. The comparison took place as planned: a 20-minute leg at 22 kft, and 12-minute legs at 12 ft and 1 kft, with 1000 ft/min descents. The air in the comparison region was quite clean, although reasonable dynamic range was achieved in some compared constituents. Most instruments were working. The cleanest air of the mission was encountered in the marine boundary layer (O_3 < 15 ppbv) below the base of the fair weather cumulus clouds. On the return leg, we were held for about an hour at 28 kft by ATC before ascending to 34 kft, where we encountered a persistent polluted layer for ~45 minutes. We then descended to 18 kft, encountering a few thin pollution layers interspersed with significant cloudiness. Heading back to Portsmouth, we ascended to 34 kft above low clouds, where DIAL was able to observe the broken filaments of higher ozone between 15 kft and 34 kft. The primary objectives of observing outflow and comparing with the BAe146 were accomplished, as were secondary objectives of persistent *in situ* sampling in clouds, over-flight of a region recently sampled by the NOAA WP-3B, and creating a Lagrangian opportunity for the BAe146 and the DLR Falcon.

The navigational data are available at URL:
http://www.dfrc.nasa.gov/Research/AirSci/DC-8/ICATS/index.html


DIAL DC-8 Track (Flight 13) July 28, 2004
INTEX: WCB Outflow and BAe146 -- Science Flight #11
Egbert
Pease
Yarmouth
Sable Isl.
Narragansett
Beltsville
Wallops
21:00
20:00
19:05
22:00
12:00
13:00
14:00
15:00
18:00
15:30
16:03
17:03
16:3
50
45
40
35
30
25
-80
-70
-60
-50
-40
Latitude (degrees)
Longitude (degrees)

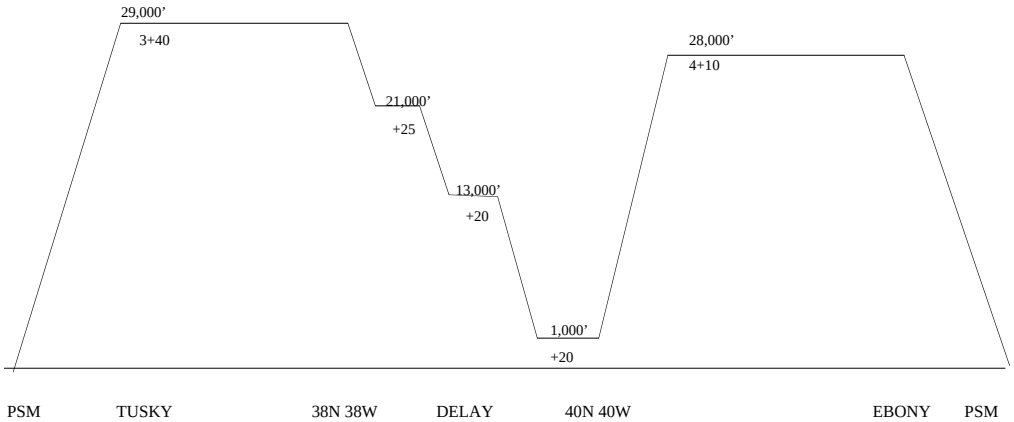
DC-8 NASA 817 INTEX 28 JUL 04



DC-8 NASA 817 INTEX 28 July 04

SPIRAL CLIMBS
to 10,000 msl @1,000 fpm
then 1500 fpm

ALL ENROUTE CLIMBS/DESCENTS
1500 FPM



TYPE ACFT DC-8	CALL SIGN NASA817	DATE	FROM PEASE INTL TR N 43 05.5 W070 50.0	TO PEASE INTL TR N 43 04.7 W070 49.4	PLND TO 12:00.0	ACT TO	PILOT	COPILOT
TOT DIST 3257.3	TOT TIME 09+57.2	FUEL REQ 95527					NAVIGATOR	ENGINEER

TP OTD#	Fix/Point Description	FREQ	Latitude Longitude	Alt Wind	TAS GS	TC MC	LEG DIST DIST REM	LEG TIME TIME REM	ETA	RETA	ATA	REMARKS
1	KPSM 16/RW PEASE INTL TR		N 43 05.5 W070 50.0	94M		149 165	5.0 3252	00+03.0 09+54	12:00			
2	TUSKY/W CDQM/MOCTON		N 43 33.9 W067 00.0	29000M 260/025	420 483	079 097	168.6 3084	00+25.4 09+29	12:28			
3	GRUPI/W KZNY/NEWYORK		N 43 52.0 W058 58.3	29000M 260/025	420 444	087 106	355.5 2728	00+48.0 08+41	13:16			
4	.N44W58		N 44 00.0 W058 00.0	29000M 260/025	420 444	089 109	383.1 2345	00+51.7 07+49	14:08			
5	.N43W48 LPPO		N 43 00.0 W048 00.0	29000M 260/025	420 445	098 116	440.5 1905	00+59.4 06+50	15:07			
6	.N38W38 NOZ PT		N 38 00.0 W038 00.0	29000M 260/025	420 421	163 179	313.4 1591	00+43.7 06+06	15:51			
	.delay		N 38 00.0 W038 00.0	29000M 260/025	350 361	163 178	0.0 1591	01+15.0 04+51	17:06			
7	.N40W40 KZNY		N 40 00.0 W040 00.0	28000M 260/025	360 321	322 337	152.1 1439	00+26.8 04+24	17:32			
8	.N4130W45		N 41 30.0 W045 00.0	28000M 260/025	360 335	292 308	245.1 1194	00+43.8 03+41	18:16			
9	.N4240W50		N 42 40.0 W050 00.0	28000M 260/025	360 335	287 306	234.0 960	00+41.9 02+59	18:58			
10	LOMPI/W CDQM/MOCTON		N 44 00.0 W057 00.0	28000M 260/025	360 335	285 304	316.7 643	00+56.7 02+02	19:55			
11	EBONY KZBW		N 44 54.1 W067 09.4	28000M 260/025	360 335	277 297	439.6 204	01+18.7 +43	21:14			
12	SEAER J573 SEAER		N 43 55.5 W069 29.5	23571M 260/025	N/A N/A	239 256	116.3 87	00+20.4 +23	21:34			
13	SCARS J573 SCARS		N 43 32.9 W070 28.5	12896M 260/025	N/A N/A	239 255	43.3 44	00+07.3 +16	21:41			

OTD#	Description		Longitude	Wind	GS	MC	DIST REM	TIME REM				
14	ENE J573 KENNEBUNK	116X 117.10	N 43 25.5 W070 36.8	3573M 260/025	N/A N/A	239 255	14.0 30	00+02.4 +13	21:44			
15	ENDEY/W ENDEY		N 43 16.5 W070 37.5	3000M 260/025	N/A N/A	236 250	18.7 11	00+03.2 +10	21:47			
16	KPSM/A PEASE INTL TR		N 43 04.7 W070 49.4	100M 260/025		149 165	11.0 0	00+10.0 +00	21:57			